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EXAMINER

ALAM, SHAHID AL

ART UNIT

PAPER NUMBER

2162

MAIL DATE

DELIVERY MODE

04/03/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                      |                                    |  |
|------------------------------|--------------------------------------|------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/692,668 | <b>Applicant(s)</b><br>BALI ET AL. |  |
|                              | <b>Examiner</b><br>Shahid Al Alam    | <b>Art Unit</b><br>2162            |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 December 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-5,7,8,24-32,35 and 36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 32,35 and 36 is/are allowed.
- 6) ☒ Claim(s) 1-4,7,8,24-26 and 29-31 is/are rejected.
- 7) ☒ Claim(s) 5,27 and 28 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 December 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. Claims 1 – 5, 7 – 8, 24 – 32 and 35 – 36 are pending in this Office action.

#### *Response to Arguments*

2. Applicant's arguments filed December 26, 2007 have been fully considered but they are not persuasive.

Applicant argues that the log entries in Voigt are different from the log entries described and claimed in the present application; and neither Voigt alone, nor Voigt in combination with Cronic, teach or suggest maintaining a log of a plurality of requests, where each log entry corresponds to a write operation to be performed by a storage server.

Examiner respectfully disagrees all of the allegations as argued.

In response to Applicant's argument, Voigt teaches a data storage system employing distributed write disk log system that includes a memory map store that provides for persistent storage for the virtual mapping information used to map disk array, which indicates there is a write operation. Voigt also teaches Sequence number is a generated number that is **sequentially incremented** for each new record added (write) to the transaction log. Voigt further provides improved system performance for disk log writing by managing and distributing certain of the log writes to any least busy disk selected from across the multiple available disks, thus reducing contention for disk accesses between log I/Os and other I/O's in progress.

In view of the above, the examiner contends that all limitations as recited in the claims have been addressed in this Action and the rejection is hereby sustained.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 8, 24 and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent Number 6,055,604 issued to Douglas Voigt et al. (hereinafter “Voigt”).

With respect to claim 1, Voigt teaches maintaining a log in a storage server, said log containing a plurality log entries (column 4, lines 42 – 54),

each log entry corresponding to a request to perform write operation on a set of storage devices (Figure 7 and column 2, lines 56 – 60 and column 3, lines 40 – 42); and

including a separate checksum in each of the log entries, each checksum for use by a checksum algorithm in determining data integrity of the corresponding log entry (Figure 7, item 135 and column 8, lines 15 – 32).

As to claim 2, the requests originate from a set of client devices serviced by the storage server (column 3, lines 40 – 42 and column 4, lines 25 – 29).

As to claims 8 and 30, maintaining an entry count in the log to indicate the number of log entries in the log (Figure 7, item 120); and

using the checksum of one of the log entries to determine whether the entry count is corrupted (column 9, lines 15 – 26; checking the entry's checksum for

corruption of the record entails a check of all of the data of the record, which includes the sequence number).

With respect to claim 24, Voigt teaches maintaining a log of a plurality requests in a storage server (column 4, lines 42 – 54),

each of the requests corresponding to a write operation to be performed by the storage server on a set of storage devices, the log including a separate log entry for each of the write operation requests (Figure 7 and column 2, lines 56 – 60 and column 3, lines 40 – 42); and

including a separate checksum in each of the log entries, each checksum for use by a checksum algorithm in determining data integrity of the corresponding log entry (Figure 7, item 135 and column 8, lines 15 – 32).

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 3, 4, 7, 25, 26, 29 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Voigt and further in view of U.S. Patent Number 6,880,149 issued to Paul Cronce ("Cronce").

As to claims 3 and 25, Voigt teaches claimed invention substantially as claimed, however, Voigt does not explicitly indicate selecting the checksum algorithm based on a desired balance between performance and checksum strength as claimed.

Cronce teaches claimed selecting the checksum algorithm based on a desired balance between performance and checksum strength (Cronce: column 5, lines 33 – 36 and column 6, lines 56 – 58).

It would have been obvious to a person of ordinary skill in the art at the time of the invention was made to modify the teachings of Voigt with the teachings of Cronce to have used a dynamic selection schema for choosing the currently most suitable checksum algorithm for use in the log. One of ordinary skill in the art at the time of invention would have been aware of the tradeoffs involved in using any single checksum algorithm and thus knowing that the loading of a storage system would be highly variable, and only predictable to a limited extent. Combination would allow the application to validate code base integrity during normal execution, and allow the

programmer to place the validation code in multiple locations within the code base. The programmer is also allowed to customize validation code to prevent location using pattern-matching searches (Cronce: column 2, lines 15 – 25).

As to claims 4 and 26, Voigt teaches claimed invention substantially as claimed, however, Voigt does not explicitly indicate automatically selecting the checksum algorithm based on a predetermined criterion as claimed.

Cronce teaches claimed automatically selecting the checksum algorithm based on a predetermined criterion (Cronce: column 6, lines 5 – 8; a preference setting is a form of a predetermined criteria).

It would have been obvious to a person of ordinary skill in the art at the time of the invention was made to modify the teachings of Voigt with the teachings of Cronce to have used a dynamic selection schema for choosing the currently most suitable checksum algorithm for use in the log. One of ordinary skill in the art at the time of invention would have been aware of the tradeoffs involved in using any single checksum algorithm and thus knowing that the loading of a storage system would be highly variable, and only predictable to a limited extent. Combination would allow the application to validate code base integrity during normal execution, and allow the programmer to place the validation code in multiple locations within the code base. The programmer is also allowed to customize validation code to prevent location using pattern-matching searches (Cronce: column 2, lines 15 – 25).

As to claims 7 and 29, Voigt teaches claimed invention substantially as claimed, however, Voigt does not explicitly indicate a separate algorithm variable in each of the log entries, to specify a checksum algorithm to be used separately for each said log entry as claimed.

Cronce teaches claimed a separate algorithm variable in each of the log entries, to specify a checksum algorithm to be used separately for each said log entry (Cronce: column 5, lines 16 – 25 and 23 – 25; see also Figure 4b, item 420).

It would have been obvious to a person of ordinary skill in the art at the time of the invention was made to modify the teachings of Voigt with the teachings of Cronce to have used a dynamic selection schema for choosing the currently most suitable checksum algorithm for use in the log. One of ordinary skill in the art at the time of invention would have been aware of the tradeoffs involved in using any single checksum algorithm and thus knowing that the loading of a storage system would be highly variable, and only predictable to a limited extent. Combination would allow the application to validate code base integrity during normal execution, and allow the programmer to place the validation code in multiple locations within the code base. The programmer is also allowed to customize validation code to prevent location using pattern-matching searches (Cronce: column 2, lines 15 – 25).



As to claim 31, Voigt teaches claimed invention substantially as claimed, however, Voigt does not explicitly indicate the storage appliance is a network appliance as claimed.

Cronce teaches claimed indicating the storage appliance is a network appliance (Cronce: column 11, lines 37 – 41).

It would have been obvious to a person of ordinary skill in the art at the time of the invention was made to modify the teachings of Voigt with the teachings of Cronce to have used a dynamic selection schema for choosing the currently most suitable checksum algorithm for use in the log. One of ordinary skill in the art at the time of invention would have been aware of the tradeoffs involved in using any single checksum algorithm and thus knowing that the loading of a storage system would be highly variable, and only predictable to a limited extent. Combination would allow the application to validate code base integrity during normal execution, and allow the programmer to place the validation code in multiple locations within the code base. The programmer is also allowed to customize validation code to prevent location using pattern-matching searches (Cronce: column 2, lines 15 – 25).

### ***Allowable Subject Matter***

5. **Claims 5, 27 and 28 are objected to** as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is an examiner's statement of reasons for allowance:

**Claims 32, 35 and 36 are allowed over the prior art made of record.**

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

***Contact Information***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shahid Al Alam whose telephone number is (571) 272-4030. The examiner can normally be reached on Monday-Thursday 8:00 A.M.- 4:00 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Breene can be reached on (571) 272-4107. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Shahid Al Alam/  
Primary Examiner, Art Unit 2162

March 28, 2008